(No Model.) 3 Sheets—Sheet 1.

C. E. SCRIBNER & E. P. WARNER.

ELECTRIC ARC LAMP.

No. 514,505. Patented Feb. 13, 1894.

Fig. 1.

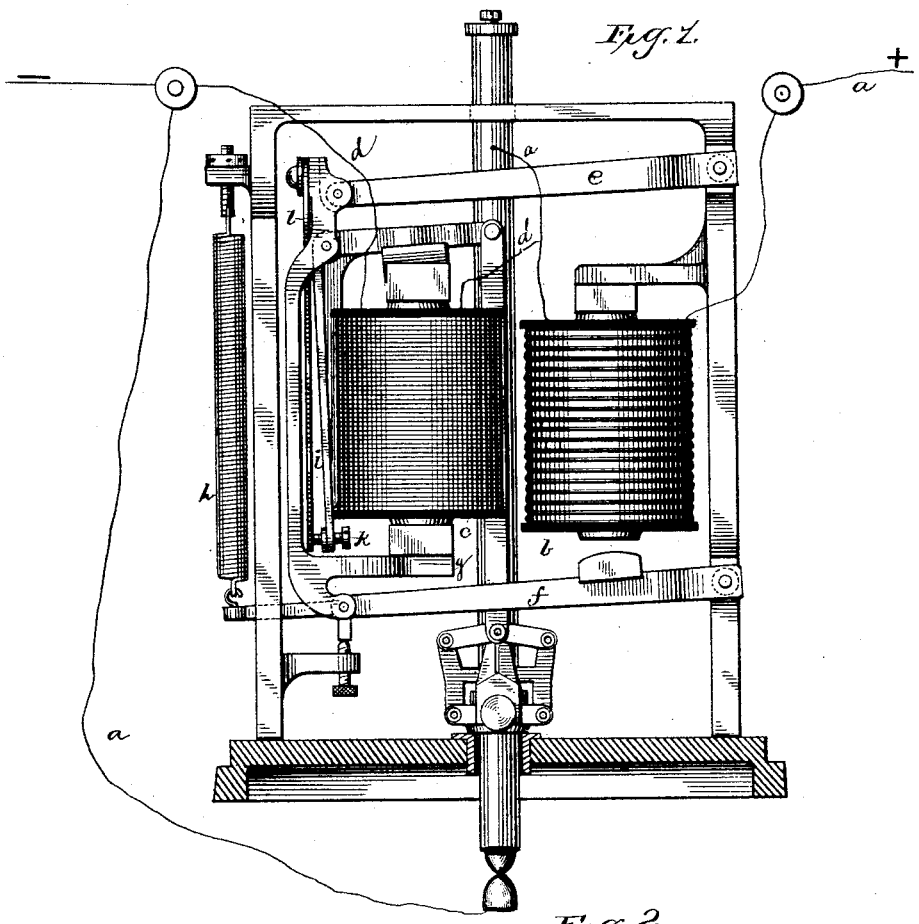
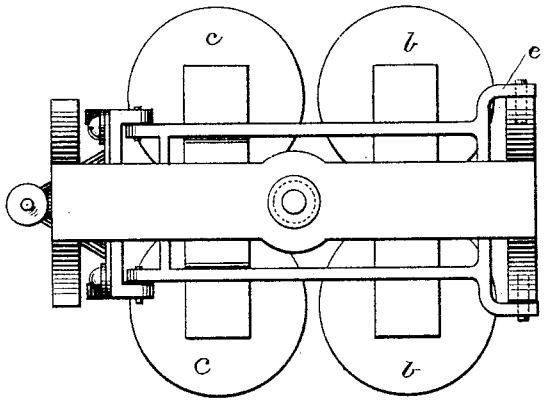


Fig. 2.



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WASHINGTON, D. C.

(No Model.) 3 Sheets—Sheet 2.

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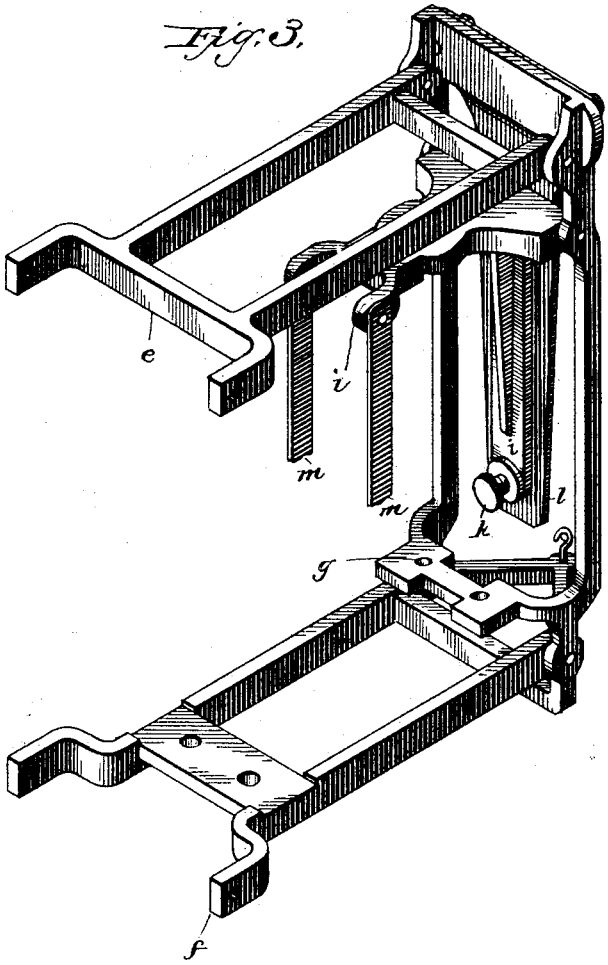
Fig. 3.



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3 Sheets—Sheet 3.

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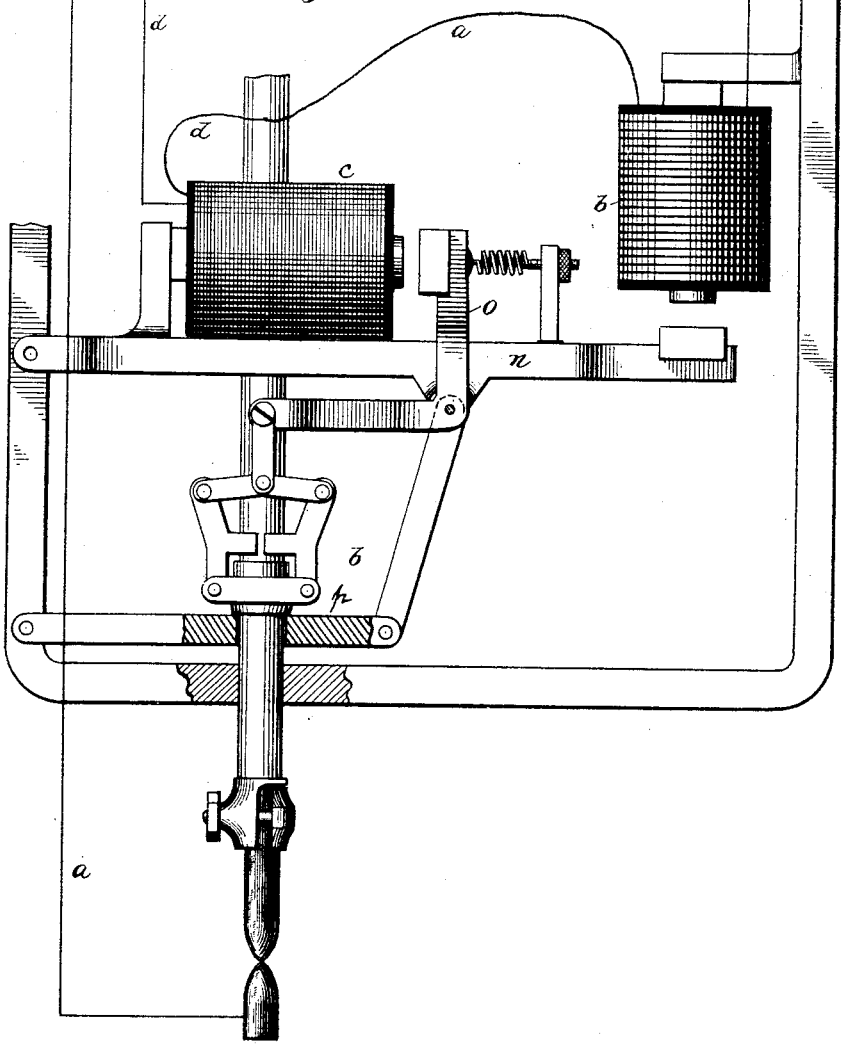
Fig. 4.



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UNITED STATES PATENT OFFICE.

CHARLES E. SCRIBNER AND ERNEST P. WARNER, OF CHICAGO, ILLINOIS, ASSIGNORS TO THE WESTERN ELECTRIC COMPANY, OF SAME PLACE.

ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 514,505, dated February 13, 1894.

Application filed May 27, 1890. Serial No. 353,313. (No model.)

To all whom it may concern:

Be it known that we, CHARLES E. SCRIBNER and ERNEST P. WARNER, citizens of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Electric-Arc Lamps, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

Our invention relates to that class of electric arc lamps in which the carbons are initially in contact and automatically separated when current is established so as to form the arc. A lifting magnet for drawing the carbons apart is placed in the main circuit and a feeding magnet of high resistance is placed in a shunt circuit around the arc, the connections between the rod and the magnets being such that as the carbons burn away the rod carrying the upper carbon will be fed downwardly.

The object of our invention, speaking generally, is to provide for automatically separating the carbons when current is established through the lamp in connection with means for maintaining the arc as nearly uniform as is possible during the entire time that the lamp is burning. This we accomplish by mounting the electro magnet which is included in the shunt around the arc upon a frame, the position of which frame is controlled by the lifting magnet. The clutch mechanism is connected with the armature lever of the fine wire magnet carried upon the frame and the different parts are so adjusted that the feeding of the carbons is effected by a very slight variation in the current through the feeding magnet caused by lengthening of the arc.

In one form of our invention the floor or stop against which the clutch comes when lowered is made movable with the frame so that when the frame is lifted by the attraction of the coarse wire magnet this floor or stop will be also raised. By this construction the clutch may be allowed to almost or quite touch the stop while the lamp is in operation. The slighest downward movement of the clutch caused by increase of current through the shunt magnet will permit the rod to feed. In another form we mount the feed magnet on a movable frame controlled as to position by the lifting magnet but do not make the floor or stop a part of such movable frame. In either form, however, when current is first established the lifting magnet is excited and attracts its armature, thereby lifting the movable frame and the parts carried thereby including the clutch, and the clutch being thus raised grasps the rod to initially separate the carbons and establish the arc, and during the burning of the lamp the lifting magnet retains this frame in its elevated position, the feeding being effected little by little as the carbons burn away by the action of the fine wire magnet through its armature lever upon the clutch, the clutch being pressed against its stop to permit the rod to feed by gravity upon a very slight increase of the current through the feeding magnet.

Our invention is illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of the regulating mechanism of an arc lamp embodying our invention in connection with the circuits. Fig. 2 is a plan view thereof. Fig. 3 is an isometric view of the movable frame, the magnets and their armatures being removed. Fig. 4 is a side elevation partly in section of an arc lamp embodying a modification of our invention, the floor or stop of the clutch being attached to and adapted to move with the frame carrying the fine wire magnet.

Like parts are indicated by similar letters of reference throughout the different figures.

Referring now to the drawings it will be seen that the main circuit *a* passes through the coarse wire magnet *b* and thence to the rod and thence through the carbons and out. The fine wire magnet *c* is included in a shunt *d* connecting with different sides of that portion of the main circuit which includes the carbons.

As shown in Figs. 1, 2 and 3 the movable frame consists of the arms *e f* pivoted to the frame of the lamp and the bracket or support *g* carried thereby which supports the feeding magnet in the shunt.

The lifting magnet *b* is rigidly supported

upon the frame of the lamp and its pole is presented to the armature upon the pivoted arm *f* as shown in Fig. 1.

We preferably provide a spring or other suitable means for lessening the load of the movable frame which is controlled by the lifting magnet.

The armature lever *i* of the feeding magnet may be in the form of a bell crank and is preferably provided with an adjustable screw or stop *k* bearing upon a spring *l*. The links *m m* from this armature lever are connected with the clutch. Thus we have the feeding magnet acting upon its armature to control the feeding of the lamp. Increase of current through the feeding magnet causes the armature to be moved against the tension of spring *l* to lower the links *m* and hence the clutch; the clutch being pressed against its stop is opened sufficiently to permit the rod to descend. The current being established through the lamp lifting magnet *b* attracts its armature and raises the movable frame *e f g* and with it the feeding magnet and its armature lever and thereby the clutch and rod so that the establishment of the arc is accomplished by the action of the lifting magnet *b* upon the movable frame. As long as the current continues the movable frame will be held in its elevated position by the attractive power of the lifting magnet; being thus held or retained in position the feeding is brought about by the fine wire magnet *c* as hereinbefore described.

As shown in Fig. 4 the lever *n* is pivoted at one end to the frame of the lamp and at its other end is provided with an armature presented to the pole of lifting magnet *b*. The feeding magnet *c* is placed upon this lever or support *n* between the fulcrum or pivot and the armature of magnet *b*. The lever *o* of the feeding magnet is pivoted as shown to the movable support *n* and is properly connected with the clutch. The floor or stop *p* of this clutch is also linked to this movable support *n* so that when lifting magnet *b* is excited to attract its armature this floor or stop *p* will be raised at the same time with the other parts of the feeding mechanism. Thus the stop is raised with the clutch when the movable frame is drawn up by the lifting magnet to separate the carbons and initially establish the arc. The clutch may thus be, so to speak, resting upon or touching its stop while the lamp is in its normal operation and such slight increase of the attraction of magnet *c*, as will under these conditions serve to loosen the grip of the clutch upon the rod, will be sufficient to effect a feed of the rod.

We prefer the form of arc regulator illustrated in Figs. 1, 2 and 3 as being more compact, yet we have operated successfully a lamp of the form detailed in Fig. 4.

Having thus described our invention, we claim as new and desire to secure by Letters Patent—

1. In an electric arc lamp, the combination with a series magnet supported upon the lamp frame, of a magnet connected in shunt of the arc supported upon a movable frame pivoted to the lamp frame, said movable frame carrying the armature of the series magnet, whereby said movable frame may be raised, a bell crank carried upon the movable frame, a clutch connected with one arm of said bell crank and held in position by a yielding pressure, said bell crank carrying the armature of the shunt magnet whereby when said armature is attracted the clutch may be disengaged and the carbon be permitted to feed, substantially as described.

2. In an electric arc lamp, the combination with a series magnet supported upon the frame of the lamp, of a magnet connected in shunt of the arc supported upon a movable frame, said movable frame carrying the armature of the series magnet, whereby said frame may be raised, a clutch connected with the armature of the shunt magnet and adapted to be actuated thereby, a feeding board adapted to move with the frame carrying the shunt magnet, whereby the clutch may be actuated by the shunt magnet alone and not by any differential action of the shunt and series magnets, substantially as described.

3. In an electric arc lamp, the combination with the series magnet *b*, of the shunt magnet *c*, the pivoted movable frame *n* carrying the shunt magnet and the armature of the series magnet, the bell crank *o* pivoted upon the frame *n* and carrying upon one arm the armature of the shunt magnet, the clutch *b*, means for connecting the clutch *b* with the bell crank *o*, the pivoted feeding floor *h* and means for connecting the same with the frame *n*, substantially as described.

In witness whereof we hereunto subscribe our names this 20th day of May, A. D. 1890.

CHARLES E. SCRIBNER.
ERNEST P. WARNER.

Witnesses:
GEORGE P. BARTON,
ELLA EDLER.